

BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA

DOCKET NO. 2018-318-E

In the Matter of)	REVISED REBUTTAL
)	TESTIMONY OF
Application of Duke Energy Progress, LLC for)	KELVIN HENDERSON FOR
Adjustments in Electronic Rate Schedules and)	DUKE ENERGY PROGRESS,
Tariffs and Request for an Accounting Order)	LLC

1 **I. INTRODUCTION AND PURPOSE**

2 **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND**
3 **CURRENT POSITION.**

4 A. My name is Kelvin Henderson and my business address is 526 South
5 Church Street, Charlotte, North Carolina. I am Senior Vice President of
6 Nuclear Operations for Duke Energy Corporation (“Duke Energy”), with
7 direct executive accountability for Duke Energy’s North Carolina nuclear
8 stations, including Duke Energy Progress, LLC’s (“DE Progress” or the
9 “Company”) Brunswick Nuclear Station (“Brunswick”) in Brunswick
10 County, North Carolina; the Harris Nuclear Station (“Harris”) in Wake
11 County, North Carolina; and Duke Energy Carolinas, LLC’s (“DE
12 Carolinas”) McGuire Nuclear Station, located in Mecklenburg County,
13 North Carolina.

14 **Q. DID YOU PREVIOUSLY FILE DIRECT TESTIMONY IN THIS**
15 **PROCEEDING?**

16 A. Yes, I did.

17 **II. PURPOSE AND SCOPE**

18 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

19 A. My testimony will respond to the direct testimony of ORS witness Willie J.
20 Morgan of the South Carolina Office of Regulatory Staff (the “ORS”).
21 Specifically, I respond to ORS Witness Morgan’s recommendation to
22 remove the Company’s request to adjust depreciation and amortization
23 expenses to establish a reserve for end of life nuclear costs not captured in

1 its decommissioning studies¹. I also respond to Witness Morgan's
2 recommendation to exclude \$17.83 million of nuclear inventory from rate
3 base.²

4 **III. NUCLEAR RESERVE**

5 **Q. WHAT IS ORS WITNESS MORGAN RECOMMENDING AS IT**
6 **PERTAINS TO THE ESTABLISHMENT OF RESERVE FOR END**
7 **OF LIFE NUCLEAR COSTS?**

8 A. Witness Morgan recommends that the Commission deny the Company's
9 requested adjustments to establish a reserve fund and collect approximately
10 \$2.9 million annually for end of life nuclear costs, including nuclear fuel
11 and parts inventory, not captured in the Company's decommissioning
12 studies. Witness Morgan argues that the requested reserve fund includes
13 estimates for end of life nuclear fuel and parts inventory that are not
14 currently known and measurable. Further, he opines that it is not equitable
15 for the Company's customers to pay for nuclear retirement costs when the
16 date of retirement of the nuclear units is currently uncertain.

17 **Q. DO YOU AGREE WITH HIS RECOMMENDATION?**

18 A. No, I do not. The establishment of the end of life nuclear reserve is in the
19 best interest of today's customers and the estimates used to determine the
20 level of reserve funding were calculated appropriately.

¹ Direct Testimony of Willie J. Morgan pp.3-4

² Direct Testimony of Willie J. Morgan p.7

1 **Q. PLEASE EXPLAIN WHY THE ESTABLISHMENT OF THE**
2 **NUCLEAR RESERVE IS IN THE BEST INTEREST OF TODAY'S**
3 **CUSTOMERS?**

4 A. South Carolina customers have received and will continue to receive the
5 benefits from the strong safety and operational performance of the
6 Company's nuclear fleet. The end of life nuclear fuel and inventory costs
7 not covered in the decommissioning fund represent costs of continued
8 operations of the nuclear fleet. Our customers benefit if those costs are
9 accrued over the remaining life of the nuclear units.

10 **Q. PLEASE EXPLAIN WHY THE ESTIMATES USED TO ESTABLISH**
11 **THE END OF LIFE NUCLEAR RESERVE FUND WERE**
12 **CALCULATED APPROPRIATELY.**

13 A. The reserve fund estimate primarily consists of the remaining fuel in core
14 and inventory used to maintain the units. While ORS witness Morgan is
15 correct that the exact end of life costs are currently not known, the Company
16 used solid principles to estimate the required funds.

17 Regarding nuclear fuel, the Company used current forecasts for
18 uranium, fabrication, and enrichment to calculate the estimated value of
19 underutilized fuel remaining in the last core. Due to the very nature of
20 nuclear power production, fuel cores are carefully designed and balanced to
21 maintain safety margins and production. When a nuclear unit refuels,
22 approximately one third of the fuel is replaced and the remaining fuel is
23 shifted in the core to maintain safe production capability for the next

1 operating cycle. When a unit shuts down at the end of its life, approximately
2 two thirds of the fuel that would otherwise continue to support operation of
3 the next cycle (if the unit were refueled) is left underutilized as a byproduct
4 of cycle operation. Since the last day of operation is known, the projection
5 of underutilized fuel value at the end of the last operating cycle assumes
6 prudent steps will be taken to minimize this underutilization. A shorter last
7 cycle length is assumed and savings from a decreased fuel load are
8 incorporated. Since the last fuel reload will not reside in the core for
9 multiple cycles as would normally be the case, the end of cycle value of the
10 last core is further reduced to account for core design optimization available
11 with the final core load.

12 Regarding nuclear inventory, the Company used the existing
13 inventory balance, at the end of the test period, as the estimate of inventory
14 remaining on the last day of operation. Nuclear plants must be fully
15 maintained for safety purposes until removed from service, and inventory
16 must be available to support that mission. The DE Progress nuclear fleet
17 has demonstrated strong safety and reliability performance providing South
18 Carolina customers with carbon free baseload generation. Ensuring the
19 availability of proper replacement and maintenance components and
20 supplies is vital to continued excellence in operations.

1 **Q. IS WITNESS MORGAN CORRECT IN HIS ASSERTION THAT**
2 **THE RETIREMENT DATE OF THE NUCLEAR UNITS IS**
3 **UNCERTAIN?**

4 A. ORS witness Morgan is correct in his assertion that there is a licensing
5 process, which allows the Company to seek an additional 20 years of service
6 beyond the current license expiration, for the existing nuclear units. The
7 process, known as subsequent license renewal (“SLR”) was established by
8 the Nuclear Regulatory Commission. The Company has not yet filed with
9 the NRC, nor received additional license extensions from the NRC, but
10 continues to maintain the existing fleet to ensure that additional license
11 extensions remain a viable option. Until SLR is requested and granted, the
12 current license correctly bounds the end of life of each nuclear unit.

13 **Q. IS WITNESS MORGAN CORRECT IN INTERPRETTING THE**
14 **INTEGRATED RESOURCE BASE PLAN (“IRP”) AS A**
15 **DEFINITIVE STATEMENT THAT THE LICENSES FOR THE**
16 **FOUR DE PROGRESS NUCLEAR UNITS WILL BE RENEWED?**

17 A. No. The IRP is a planning and modeling tool used to establish plans for
18 meeting forecasted annual peak and energy demand, to ensure that adequate
19 capacity is available to meet requirements. The IRP is updated periodically
20 based on current forecasts and planning assumptions.

1 **Q. IS THE PROPOSED NUCLEAR RESERVE ACCRUAL PERIOD**
2 **BASED ON THE EXISTING LICENSE EXPIRATION DATE FOR**
3 **EACH UNIT?**

4 A. Yes. The proposed nuclear reserve accrual period is based on the existing
5 remaining license period for each of four DE Progress nuclear units.

6 **Q. IF LICENSE EXTENSIONS ARE SOUGHT AND GRANTED,**
7 **WOULD THE COMPANY CONSIDER ADJUSTING THE**
8 **ACCRUAL PERIOD?**

9 A. Yes. If the Company ultimately applies for and receives a license extension
10 for all or part of the existing DE Progress nuclear fleet, the Company would
11 be open to adjusting the accrual period to reflect shutdown dates based on a
12 renewed license. In fact, as Company witness Bateman³ stated in her direct
13 testimony, the annual accrual amount can be reviewed and adjusted, if
14 needed, in each future general rate case before the end of the plant's life.

15 **IV. NUCLEAR MATERIALS AND SUPPLIES INVENTORY**

16 **Q. WHAT IS ORS WITNESS MORGAN RECOMMENDING AS IT**
17 **PERTAINS TO NUCLEAR MATERIALS AND SUPPLIES**
18 **INVENTORY CATEGORIZED AS ON HOLD?**

19 A. Witness Morgan is recommending that the cost of the nuclear materials and
20 supplies ("M&S") inventory designated in a "hold" state for over four years
21 cannot be used, and therefore, should not be excluded from recovery.⁴ The

³ Direct Testimony of Laura A. Bateman p.18

⁴ Direct Testimony of Willie J. Morgan p.7

1 adjustment recommended by Witness Morgan is a reduction in nuclear
2 inventory of \$17.83 million.

3 **Q. DO YOU AGREE WITH HIS RECOMMENDATION?**

4 A. No. The Company believes nuclear M&S inventory on hold greater than
5 four years is appropriate for recovery because hold items exceeding four
6 years is not indicative that the parts will not be used. In general, nuclear
7 M&S inventory should be kept in a state that will allow it to be utilized
8 when needed. The “hold” process ensures that materials with any
9 discrepancies are properly evaluated prior to use. Materials in a “hold”
10 status do require some actions before they can be released and used.
11 However, it is incorrect to assume that simply because an item is on hold
12 longer than four years that such inventory will not ultimately be used or
13 available for use, when needed. In fact, the inventory can be made available
14 should priorities dictate applying the maintenance or engineering attention
15 to the cause for the hold.

16 **Q. PLEASE ELABORATE.**

17 A. Depending on the reason, or classification of the hold, there are several
18 factors that can influence the amount of time an item remains on hold.

19 Inventory on Repair Hold falls into two categories: items that can be
20 repaired on-site or at other Company facilities, and items that are sent to
21 external vendors for repair. Repair under both circumstances requires the
22 use of resources, either internal labor, or financial in the case of off-site
23 repairs. Once a specific need is identified and work is forecasted or

1 scheduled, the resources to repair the items are deployed. Items on Repair
2 Hold are stored and maintained in a state to support the eventual repair and
3 reuse of the item. In many cases, the items on Repair Hold are no longer
4 manufactured, and it is more economic to maintain these items on hold and
5 repair when needed versus immediately engineering an approved change.
6 In each case we balance priority and cost in order to maximize safety and
7 reliable operation, which in turn, is beneficial to our customers.

8 Items in the QA Hold classification have received an initial quality
9 assurance inspection at the time of receipt, but the inspection has identified
10 issues or non-conformances that must be resolved prior to releasing the
11 material for its intended purpose. Generally, items on QA Hold for greater
12 than four years indicate that efforts to resolve the deficiency with the vendor
13 have concluded and additional engineering analysis by the Company is
14 required. As with Repair Hold mentioned above, the Company deploys its
15 limited engineering resources to resolve the items on hold status based on
16 overall priorities.

17 Items in an Engineer Change Hold ("EC") status are held until the
18 engineering review and analysis is completed. The EC classification, as
19 Witness Morgan has defined in his testimony, encompasses items that have
20 been received, but are awaiting the completion of an engineering change
21 before the inventory can be utilized. Many systems and components in a
22 nuclear power plant are governed by detailed design specifications. When
23 a change to existing design is required, detailed engineering evaluation and

1 analysis is required to ensure the change does not adversely impact safety.
 2 Often, these design changes are necessitated by obsolescence of material
 3 designated in the original design.

4 **Q DO YOU AGREE WITH WITNESS MORGAN'S DESCRIPTION**
 5 **OF THE RESOLUTION OF A SIMILAR ISSUE THAT AROSE IN**
 6 **THE DEP RATE CASE IN NORTH CAROLINA?**

7 A. Not completely. While Witness Morgan is correct that the North Carolina
 8 Utilities Commission (the "NCUC") accepted an adjustment originally
 9 proposed by the North Carolina Public Staff ("NCPS") witness Dustin Metz
 10 to the Company's nuclear M&S inventory, the approved adjustment was
 11 based on a settlement between the Company and the NCPS, which reflected
 12 a give-and-take compromise of contested issues to reasonably balance
 13 customer interests in mitigating rate impacts with investor interests in
 14 providing for reasonable recovery of investments.⁵ Further, NCPS witness
 15 Metz did not recommend the exclusion of the value of Engineering Change
 16 Hold items greater than four years old. Specifically, he states:

17 Having worked in the nuclear industry and participated in
 18 engineering change packages, I understand that delays may
 19 occur for certain plant projects due to the need to balance
 20 and minimize the overall outage schedule. Thus, I did not
 21 include the costs associated with Engineering Change Hold
 22 category in my adjustment.⁶

⁵ *Agreement and Stipulation of Partial Settlement*, NCUC Docket No. E-2, Sub 1142 (November 2017).

⁶ *Testimony of Dustin R. Metz*, NCUC Docket. No. E-2, Sub 1142 (October 2017).

1 **Q. DOES THE INVENTORY REDUCTION RECOMMENDED BY**
2 **WITNESS MORGAN INCLUDE THE EC HOLD CATEGORY?**

3 A. Yes. It appears that the reduction recommended by Witness Morgan
4 includes items on EC Hold for greater than four years.

5 **Q. PLEASE ELABORATE AND DETAIL THE IMPACT OF EC HOLD**
6 **ITEMS.**

7 A. At the end of the test year, the DEP nuclear plants had a total of \$18,947,549
8 of material on hold for longer than four years. Of that amount, \$12,637,519
9 was on EC Hold, held for four or more years.

VI. CONCLUSION

10 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

11 A. Yes, it does.